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ECE 443L
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Lab 2: CMOS Transistor Level Current Source

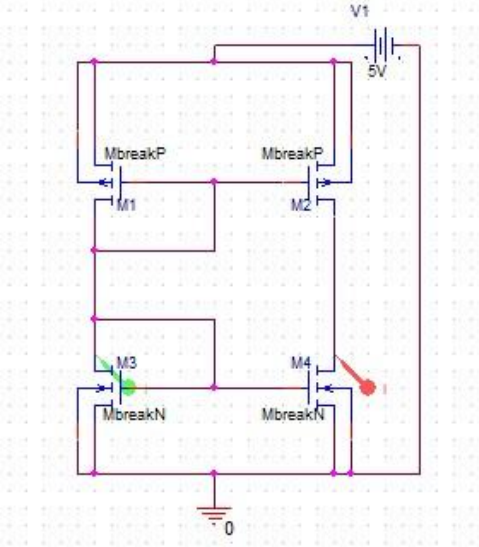
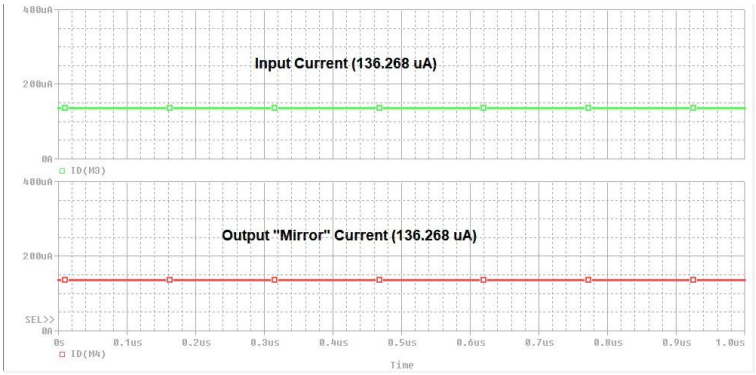


Figure 2.1: **Case 2** DC Current Mirror with Double NMOS sizing schematic



Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)		0.000		
	X Values	426.374n	426.374n	0.000		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
	ID(M4)	136.268u	136.268u	0.000		0.000	0.000	136.268u	136.268u	136.268u
CURSOR 1,2	ID(M3)	136.268u	136.268u	0.000		0.000	0.000	136.268u	136.268u	136.268u

Figure 2.2: DC Current Mirror with Double NMOS sizing waveform and cursor, I/O current @ 136.268 uA

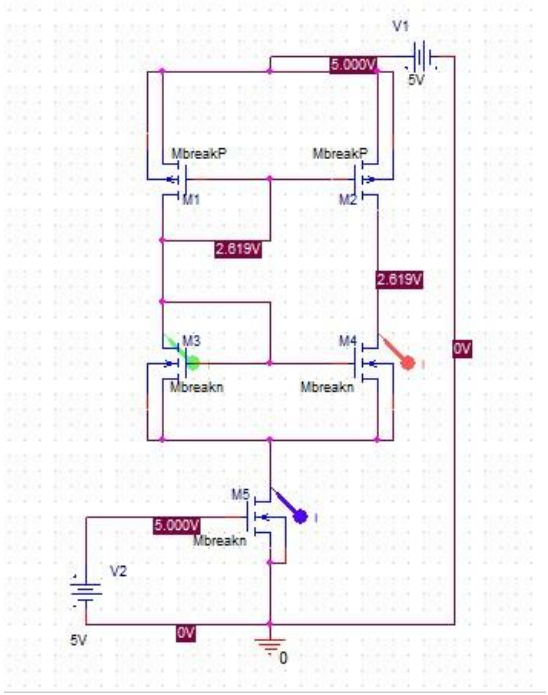
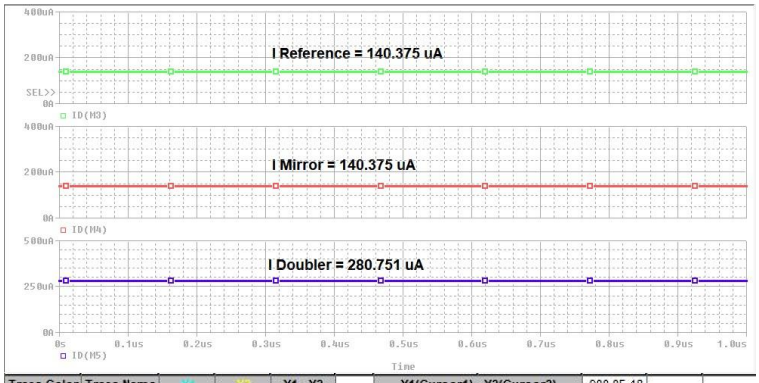


Figure 2.3: **Case 4** DC Current Mirror with Bias NMOS and 3 * (W/L) for NMOS sizing schematic



Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)		-900.0E-18		
	X Values	500.000n	0.000	500.000n		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
	ID(M5)	280.751u	280.751u	865.500f		140.375u	140.375u	280.751u	280.751u	280.751u
	ID(M4)	140.375u	140.375u	169.000f		0.000	-169.900f	140.375u	140.375u	140.375u
CURSOR 1,2	ID(M3)	140.375u	140.375u	-900.0E-18		0.000	0.000	140.375u	140.375u	140.375u

Figure 2.4: DC Current Mirror with Bias NMOS and 3 * (W/L) for NMOS sizing waveform and cursor. Reference and Mirror currents @ 140.375 uA and Doubler current @ 280.751 uA

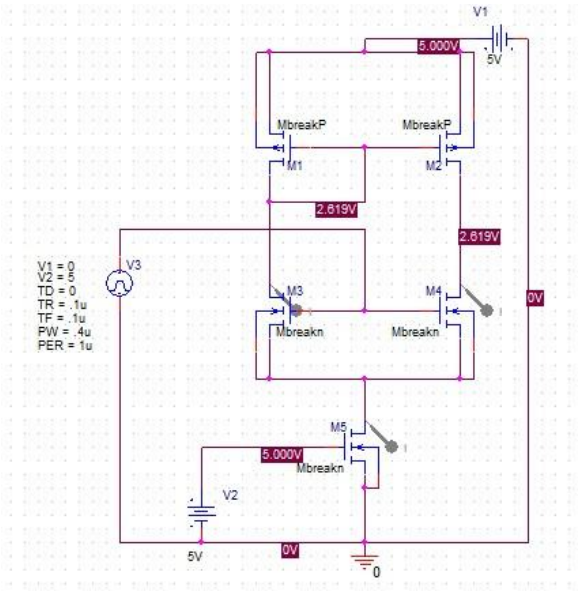
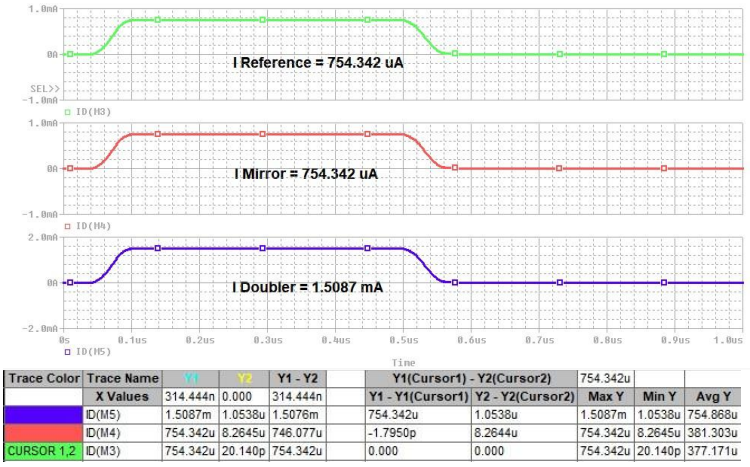


Figure 2.5: **Case 6** AC Current Mirror with Bias NMOS and 2 * (W/L) for NMOS sizing schematic, v_in(t) = 5V square wave with f = 1 MHz



Trace Color	Trace Name	Y1	Y2	Y1 - Y2		Y1(Cursor1) - Y2(Cursor2)	754.342u		
	X Values	314.444n	0.000	314.444n		Y1 - Y1(Cursor1)	Y2 - Y2(Cursor2)	Max Y	Min Y	Avg Y
	ID(M5)	1.5087m	1.0538u	1.5076m		754.342u	1.0538u	1.5087m	1.0538u	754.868u
	ID(M4)	754.342u	8.2645u	746.077u		-1.7950p	8.2644u	754.342u	8.2645u	381.303u
CURSOR 1,2	ID(M3)	754.342u	20.140p	754.342u		0.000	0.000	754.342u	20.140p	377.171u

Figure 2.6: AC Current Mirror with Bias NMOS and 2 * (W/L) for NMOS sizing waveform, v_in(t) = 5V square wave with f = 1 MHz.Reference and Mirror currents @ 754.342 uA and Doubler current @ 1.5087 mA